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GSFC DAAC and SMC M&O Equipment (As-Built Configuration)

Technical Paper

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Abstract

This document supplies a basic overview of the maintenance and operations office environment provided at the GSFC DAAC AND SMC.

Keywords: GSFC, SMC, M&O, Hardware, COTS, Software.

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Abstract

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Abbreviations and Acronyms

1. Introduction

1.1 Purpose

The purpose of this document is to present an overview description of the maintenance and operations HW used by the GSFC DAAC and SMC staff to monitor, analyze, report, and manage the operational HW and SW. This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

1.2 Organization

The remainder of the document is organized as follows:

- Section 2: Related Documents
- Section 3: GSFC DAAC and SMC M&O Equipment Requirements
- Section 4: GSFC DAAC and SMC M&O Equipment
- Section 5: GSFC DAAC and SMC M&O Equipment Test Results
- Abbreviations and Acronyms

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2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which this document's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
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2.2 Applicable Documents

Documents referenced in this document are listed below.

920-series General Documents

920-TDG-005	GSFC Cable Management Plan
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920-TDS-005	SMC Cable Management Plan
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921-series General Documents

921-TDG-002	GSFC Hardware Network Diagram
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921-TDS-002	SMC Hardware Network Diagram
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ECS CDRLs

601-CD-001	Maintenance and Operations Management Plan
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607-CD-001	ECS Maintenance and Operations Position Descriptions
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608-CD-001	ECS Operations Plan for Release B
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3. GSFC DAAC and SMC M&O Equipment Requirements

Section 4 describes the functions performed using the GSFC DAAC and SMC M&O equipment. The following comprise the requirements for this equipment.

3.1 General

GSFCMO0100	Number of staff. The GSFC DAAC and SMC M&O Equipment shall provide, at a minimum, the tools for the following numbers of DAAC staff: <ul style="list-style-type: none">a. Management and Administration¹: 2b. Engineering²: 24c. Operations³: 25d. SMC⁴: 3e. Support to include: 20 CM, SSI&T, Data Support, User Services, ILS
GSFCMO0110	System administration. The capability to backup and restore files from each component shall be provided.
GSFCMO0120	Status and performance reports. The GSFC DAAC and SMC M&O Equipment shall provide the tools to review and analyze system status and performance reports.

¹ Positions per DIDs 607 & 608: DAAC ECS Contract Manager, DAAC Administrative Assistant

² Positions per DIDs 607 & 608: DAAC System Engineer, DAAC SW Maintenance Engineer, DAAC System Test Engineer, DAAC Database Administrator, DAAC Resource Planner, DAAC CM Administrator, DAAC ILS Administrator, DAAC Science SW I&T Support Engineer, DAAC Science Coordinator

³ Positions per DIDs 607 & 608: DAAC Maintenance Coordinator, DAAC User Services Representative, DAAC Science Data Specialist, DAAC Operations Supervisor, DAAC Production Planner, DAAC Production Monitor, DAAC Resource Manager, DAAC Archive Manager, DAAC Ingest/Distribution Technician, DAAC Computer Operator, DAAC System Administrator, DAAC Operations Readiness & Performance Assurance

⁴ Positions per DIDs 607 & 608, as revised by ECS Restructure Proposal: SMC Operations Supervisor, SMC Performance Analyst, SMC Network Analyst, SMC System Administrator, SMC Configuration Management Administrator

GSFCMO0130	Management and technical reports. The GSFC DAAC and SMC M&O Equipment shall provide the tools to review and/or develop management and technical reports on ECS performance.
GSFCMO0140	DAAC internal coordination. The GSFC DAAC and SMC M&O Equipment shall provide the tools in support of coordination within the DAAC and SMC
GSFCMO0150	DAAC external coordination. The GSFC DAAC and SMC M&O Equipment shall provide the tools in support of coordination with other organizations including, at a minimum, other DAACs, the SMC, and other ECS organizations.
GSFCMO0160	ECS documentation. The GSFC DAAC and SMC M&O Equipment shall provide the tools to access, create, and maintain ECS documentation.
GSFCMO0170	System Support. The GSFC DAAC and SMC M&O Equipment shall provide display devices and tools to test system functionality and performance, support development, validation, and presentation of training material, and support Building 32 ILS functions.

3.2 Management and Administration

GSFCMO0200	Management planning resources. The GSFC DAAC and SMC M&O Equipment shall provide tools to support planning, budgeting, accounting, resource management, scheduling and other contract management activities.
GSFCMO0210	Management policies and procedures. The GSFC DAAC and SMC M&O Equipment shall provide the tools to develop and maintain ECS, DAAC, SMC and/or building policies and procedures.
GSFCMO0220	Management documents. The GSFC DAAC and SMC M&O Equipment shall provide tools for production and maintenance of memos, reports, and expense reports.

3.3 Engineering

GSFCMO0300	Operations data. The GSFC DAAC and SMC M&O Equipment shall provide the tools to allow for retrieval, storage, analysis, and distribution of operations data.
GSFCMO0310	DAAC analysis software. The GSFC DAAC and SMC M&O Equipment shall provide the tools to create and maintain DAAC-unique and SMC-unique software.

3.4 Operations

GSFCMO0400 Operations policies and procedures. The GSFC DAAC and SMC M&O Equipment shall provide the tools to develop and administer policies, directives, and guidance to implement ECS, DAAC, and SMC operations tasking, procedures, practices, and priorities.

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4. GSFC DAAC and SMC M&O Equipment

The HW and SW provided for M&O personnel to use for data collection, reduction, analysis, reporting and internal and external coordination and communications (as distinct from performance of the ECS mission using the operational resources, e.g., Data Server Subsystem, Communications Subsystem, Systems Management Subsystem, etc.). These HW and SW resources allow the engineering personnel to perform the duties described in DID 601, *Maintenance and Operations Management Plan*, and DID 607, *ECS Maintenance and Operations Position Descriptions*. The approximate number of personnel at the DAAC is shown in DID 608, *ECS Operations Plan for Release B*.

Because of its proximity to the Landover ECS Development Facility, special system testing for installations, checkout, functionality testing, and performance are performed by guests from the EDF. Additional display devices are also provided to conduct training material development support the DAAC staff's training.

Table 4-1 partitions these resources into five functional areas.

Table 4-1. GSFC and SMC M&O Equipment Component Descriptions

Functional Area	Class/Type	Specifics
DAAC Management and Administration	PC	Personal computers
	Printer	HP Printer
DAAC Engineering	X-Term	NCD HMX X-Terminals
	Printer	HP printers*
	PC	Personal computers
	Workstations	Sun workstation
	Servers	Sun servers*
	Storage	Sun Storage arrays*
	CD Drives	CD ROM
	Tape Drives	DLT
DAAC Operations	PC	Personal computers
	X-Term	NCD HMX X-Terminals
	Workstations	Sun workstation
	Storage	Sun Storage arrays*
SMC Operations	X-Term	NCD HMX X-Terminals
	Workstations	Sun workstation
	Tape Drives	DLT
Support	PC	Personal computers
	Printer	HP Printer
	X-Term	NCD HMX X-Terminals
	Workstations	Sun workstation

4.1 GSFC DAAC and SMC Functions

4.1.1 Management and Administration

The Management and Administration (MA) elements allow the management and supervisory staff at the DAAC to effectively communicate with other members of the DAAC staff as well as with external parties. Primary tasks performed on these resources include:

- ECS performance analysis - review and analyze system status and performance reports;
- ECS performance reporting - review and/or development of management and technical reports on ECS performance;
- DAAC Manager liaison - provide a point of contact to the DAAC Manager and staff on all ECS On-Site M&O organization activities;

* Also supports Management and Administration, and Operations

- ECS M&O Office liaison - provide management liaison to ECS M&O Office staff including ECS staff at other DAACs, the SMC, the EOC, the SEO, the parent ECS M&O organization, and development and support organizations;
- ECS personnel supervision - manage ECS training, certification;
- ECS planning, budgeting, accounting, resource management, scheduling and subcontract management - provide financial management and reporting on the ECS On-Site M&O organization;
- ECS policies and priorities - ensure that ECS On-Site personnel are tasked in accordance with ECS policies and priorities as driven by DAAC needs; ensure that company, ECS, DAAC and/or building, procedures and policies;
- Administrative support - support planning, budgeting, accounting, resource management, scheduling and contract management activities;
- Secretarial support - provide typing, filing, expense reports, mail distribution, meeting scheduling, etc.

4.1.2 Engineering

The engineering staff at the DAAC provides the primary set of skills to monitor current performance, monitor and develop short and long term trending data, analyses and reports, and develop configuration changes/tunings. These tasks are required so that the operational resources provide reliable, high performance support to the DAAC's customers.

The primary tasks are performed in whole or in part by this staff are:

- ECS algorithm development support - provide support to scientists in the development of algorithms that are executed by the ECS system;
- ECS algorithm I&T support - provide support to scientists in the test and integration of updated and new algorithms that are executed by the ECS system;
- ECS configuration management - coordinate usage of approved configuration management (CM) procedures; ensure that changes to the hardware, software, and procedures are properly documented and coordinated; if requested by Customer, provide recording secretarial tasks for the Customer Configuration Change Board (CCB); generate CCB monthly reports; prepare agendas for CCB meetings;
- ECS database administration - maintain the data bases and structure of the integrated system at the DAAC; provide the operations interface to perform data base administration utilities such as data base backup and recovery, performance monitoring, and tuning; administer user access control and daily data base synchronization;
- ECS development organization liaison - provide feedback on the performance of installed systems; coordinate future installations; support development activities such as design and document reviews; coordinate trouble tickets (TTs) and Configuration Change Requests (CCRs);

- ECS hardware maintenance - support the ECS availability requirements by replacement of LRUs; act as coordination point with the various vendors at the DAAC including preventative maintenance support; support the isolation of equipment problems; report on maintenance activities to the ECS ILS function;
- ECS integrated logistics support - interface with ECS ILS function in coordination of delivery of COTS hardware or software; handle ECS center shipping and receiving; act as local ILS representative;
- ECS performance analysis - analyze soft and hard copy reports on system effectiveness, productivity, capacity, and performance for ECS hardware and software resources and processes; monitor performance for trends and prepare reports on analyses;
- ECS planned upgrades - support and participate in planning and implementation of upgrades to the ECS;
- ECS property management - provide control of Government property; provide continuous audit trail from receipt of ECS procured or developed items until transfer of accountability;
- ECS quality assurance - perform Quality Assurance (QA) audits on a periodic basis to ensure adherence to established standards and procedures for hardware, software and operations; produce audit;
- ECS resource control - maintain and modify hardware and software system configurations, perform COTS administration (including operating system administration); support property management; support system anomaly tracking and analysis;
- ECS software maintenance - produce, deliver, and document corrections, modifications, and enhancements made to ECS software (including COTS), and/or adapt or incorporate COTS software for ECS use;
- ECS sustaining engineering - analyze and identify ways to accommodate needed improvements, new technologies and new concepts; manage system upgrades and evolution; control and maintain ECS updates; perform the activities necessary to assure ECS reliability, maintainability, and availability; support/provide evaluation of user inputs and monitor system performance to tune the system for optimum response and support; support operational readiness and performance assurance;
- ECS test and integration - feature test (i.e., ensure a new requirement and/or design is properly implemented) and regression test (i.e., ensure that previously provided capabilities continue to be properly provided) all system upgrades in DAAC environment; maintain and update test procedures and data bases; provide test statistics, analyses and reports.

4.1.3 Operations

4.1.3.1 DAAC Operations

The operations staff at the DAAC primarily performs its tasks using the deployed operational components. The following tasks, however, are performed in whole or in part using M&O resources.

- ECS operations personnel supervision - provide first line supervision of ECS operations, conflict resolution, policy enforcement, time keeping, productivity monitoring, shift worker scheduling, hiring, termination, promotions, performance appraisals, salary adjustments, discipline, etc., and
- ECS operations policy - develop and administer policies, directives, and guidance to implement both ECS and DAAC operations tasking, procedures, practices, and priorities.
- ECS operations readiness - ensure elements are in a state of operational readiness at all times including launch preparations; conduct Operational Readiness Reviews and monitor M&O activities, provide visibility to DAAC, ESDIS and ECS management on operations readiness;
- ECS operations training and certification - develop and maintain center specific initial and refresher operations training and certification packages; maintain training and certification records; report on staff training; coordinate with SEO system-level training and certification requirements;
- ECS performance assurance - provide coverage of operational phase activities in PAIP (DID 501); continue the tasks of the RMA program throughout the operational phase;
- ECS production scheduling - schedule system updates and maintenance schedules; coordinate user requests.
- ECS operations coordination - exchange operations information between and among DAAC operators and with personnel at other locations.

4.1.3.2 SMC Engineering

The operations staff at the SMC provides system monitoring and coordination functions in support of the DAACs' operations and EDF engineering activities.

The primary tasks are performed in whole or in part by this staff are:

- SMC operations supervision. The SMC Operations Supervisor acts as the lead ECS staff member for SMC activities. Key responsibilities include:
 - SOM and Project Scientist liaison — provide a point of contact to the SOM and Project Scientist on all ECS SMC M&O organization activities;
 - ECS M&O Office liaison — provide management liaison to ECS M&O office staff including ECS staff at the DAACs, sustaining engineering, the parent ECS M&O organization, and development and support organizations;

- ECS SMC personnel supervision — provide tasking, hiring, termination, time keeping, promotions, performance appraisals, salary adjustments, discipline, etc.;
- SMC M&O organization; ECS SMC policies and priorities — ensure that ECS SMC personnel are tasked in accordance with ECS policies and priorities as driven by SMC needs; ensure that company, ECS and SMC and/or Building 32 procedures and policies (including, but not limited to, finance, personnel, logistics access, property management, security, health, and safety) are properly followed; and
- System performance monitoring — monitor hardware and the scientific and system software status at all operating centers to determine operational status; perform quality assurance for the overall ECS performance; generate, maintain and update performance criteria and responses to performance deficiencies for system, center and element resources and activities;
- ECS SMC configuration management — maintain the ECS system configuration baseline and documentation library; coordinate system-level upgrades and adjust baselines as required in conjunction with DAAC configuration managers;
- System administration — provide support to the Trouble Ticket/Non-Conformance Report process by administering the TT/NCR data. Support UNIX system administration at the DAACs. Administer SMC computer resources.

4.2 Design Components

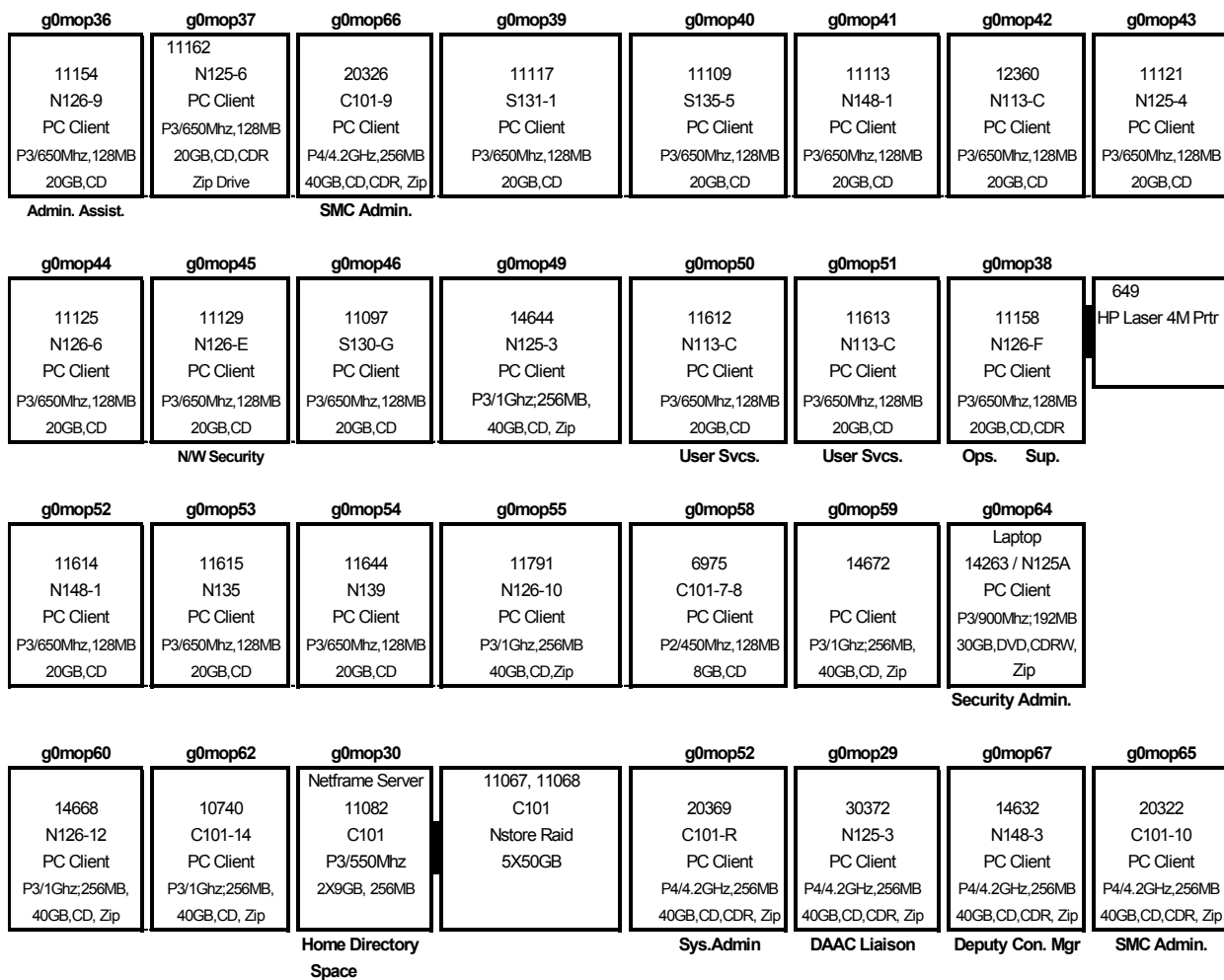
The components that comprise the GSFC and SMC M&O equipment are shown in Figures 4.2-1 through 4.2-4.

Tables 4.2-1 and 4.2-2 show the HW/SW mappings for the PCs and Sun equipment. Figure 4.2-5 shows the M&O LAN network topology.

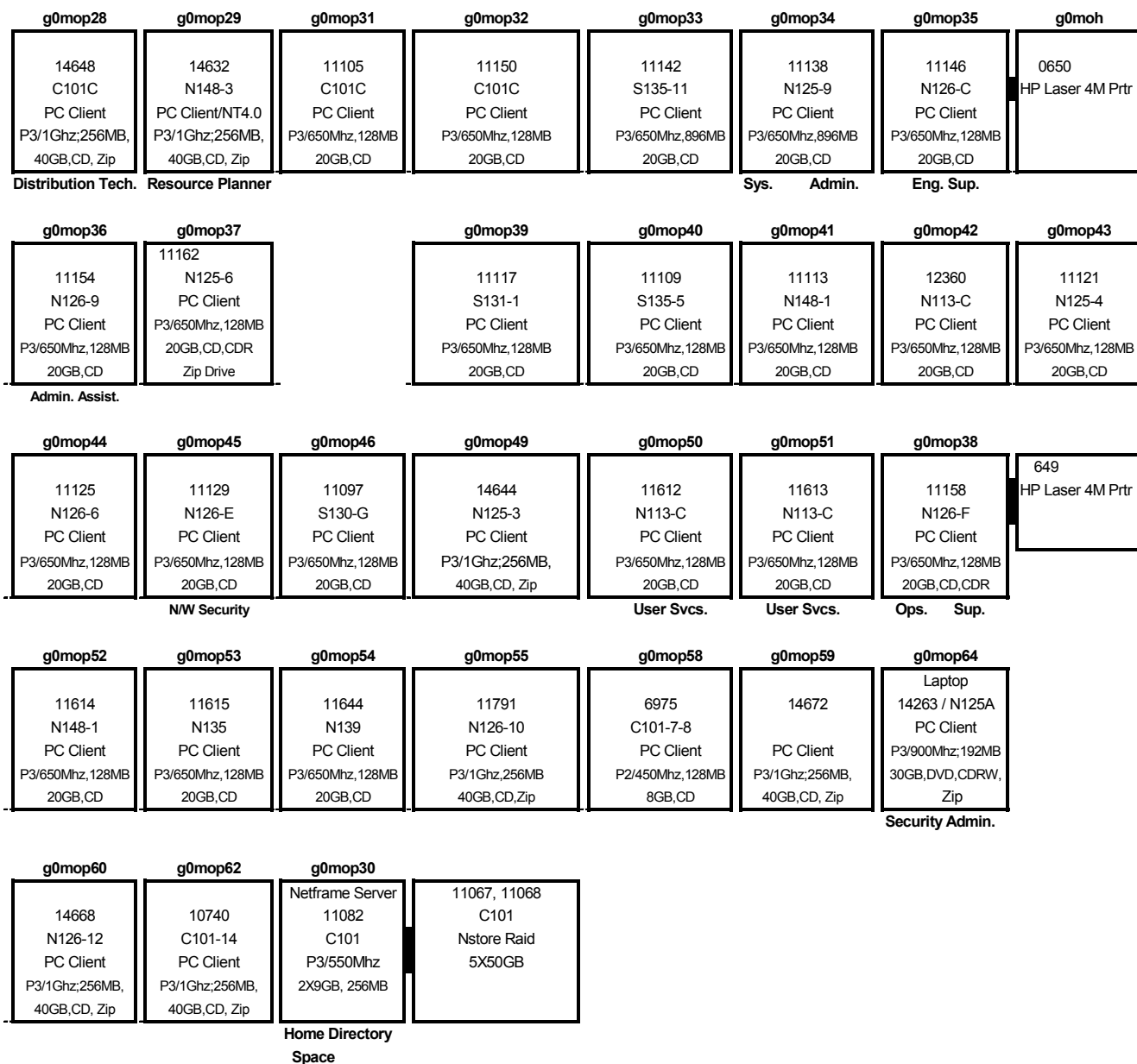
Network cabling is shown in ***GSFC Cable Management Plan***, 920-TDG-005 and the ***SMC Cable Management Plan*** 920-TDS-005.

The location of the M&O equipment in the facility is under the control of the DAAC and SMC and is documented in the property management database administered by the DAAC and SMC.

Disk configurations for the M&O equipment are under the control of the DAAC and SMC administrators.



**Figure 4.2-1. GSFC/SMC DAAC ECS M&O Hardware Diagram for PCs--As-Built
(1 of 2)**



**Figure 4.2-1. GSFC/SMC DAAC ECS M&O Hardware Diagram for PCs--As-Built
(2 of 2)**

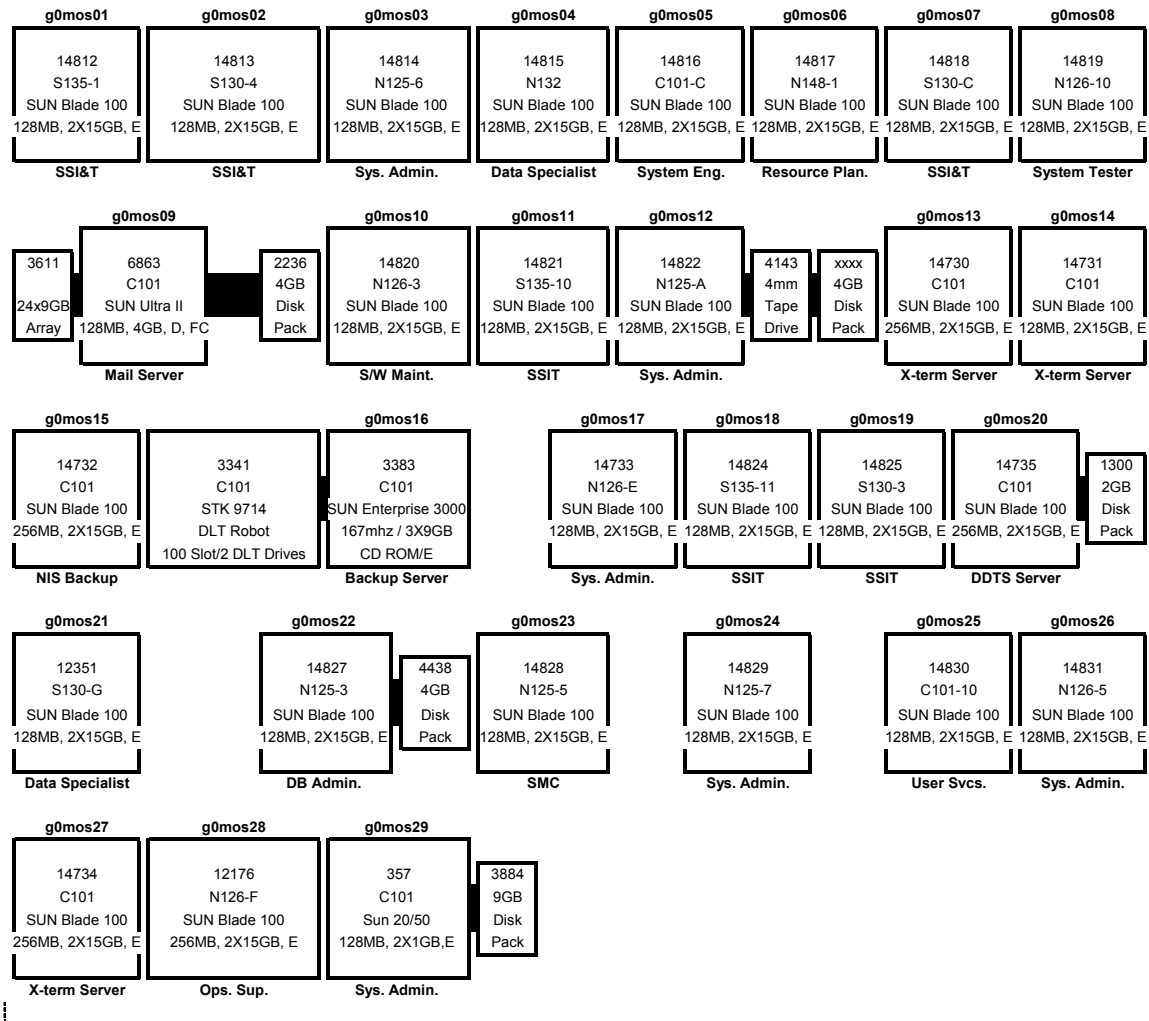


Figure 4.2-2. GSFC/SMC DAAC ECS M&O Hardware Diagram for SUNs--As-Built

GSFC M&O Hardware Diagram

XTERMS

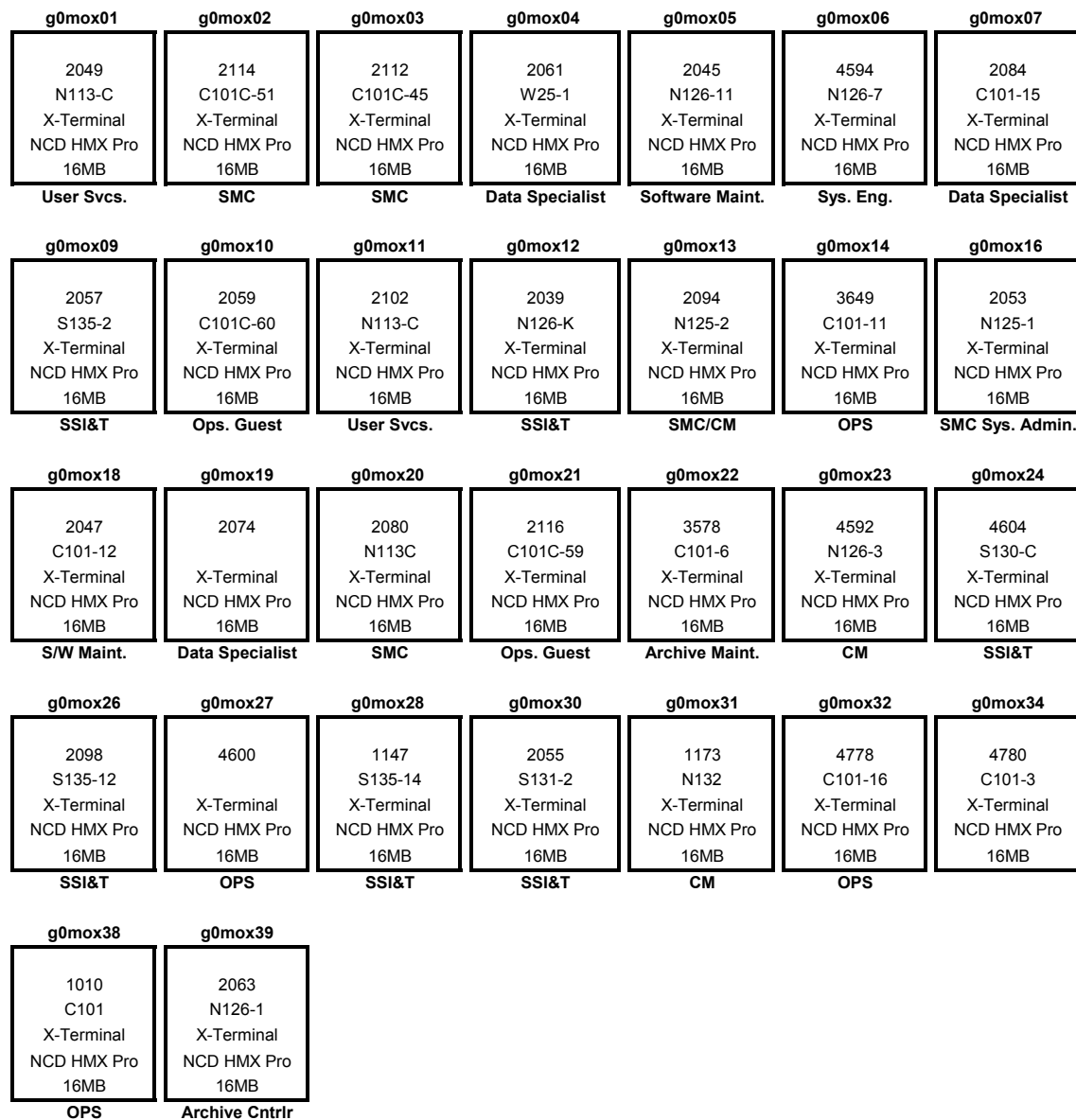


Figure 4.2-3. GSFC/SMC DAAC ECS M&O Hardware Diagram for XTerms--As-Built

GSFC M&O Hardware Diagram

MISC

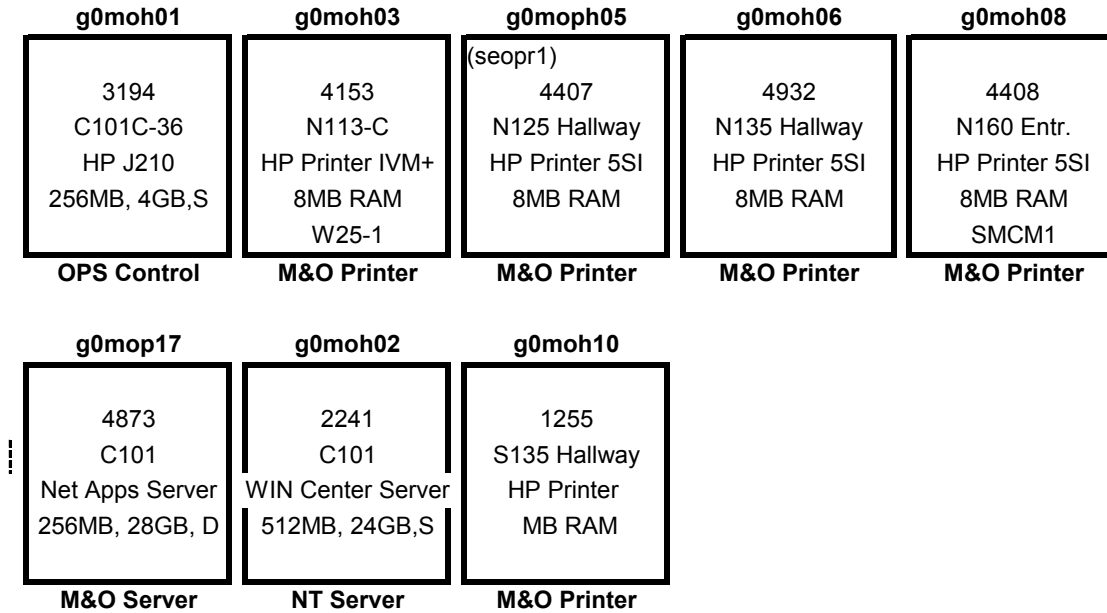


Figure 4.2-4. GSFC/SMC DAAC ECS M&O Hardware Diagram for Misc.--As-Built

Table 4.2-1. GSFC and SMC ECS M&O HW/SW Mapping (1 of 2)

Host Name	Microsoft NT 4.0/Win XP Pro	Red Hat Linux 7.2	Microsoft Project 98	Xwin-32	Windows 2000	MS Office Pro 2000	Swish V2	Citrix WinFrame 1.7	Norton Antivirus 2002
g0mop01	X			X		X			X
g0mop02	X			X		X			X
g0mop03	X			X		X			X
g0mop04	X	X		X		X			X
g0mop05	X		X	X		X			X
g0mop06	X			X		X			X
g0mop07	X			X		X			X
g0mop08	X		X	X		X			X
g0mop09	X			X		X			X
g0mop12	X			X		X			X
g0mop13	X			X		X			X
g0mop14	X		X	X		X			X
g0mop16	X			X		X			X
g0mop18	X			X		X			X
g0mop19	X			X		X			X
g0mop20	X			X		X			X
g0mop21	X			X		X			X
g0mop22	X		X	X		X			X
g0mop23	X			X		X			X
g0mop24	X			X		X			X
g0mop25	X			X		X			X
g0mop26	X			X		X			X
g0mop28	X			X		X			X
g0mop29	XP Pro			X		X			X
g0mop30	X					X		X	X
g0mop31	X			X		X			X
g0mop32	X			X		X			X
g0mop33	X			X		X			X
g0mop34	X			X		X			X
g0mop35	X		X	X		X			X
g0mop36	X			X		X			X
g0mop37	X			X		X			X
g0mop38	X		X	X		X			X
g0mop39	X			X		X			X
g0mop38	X			X		X			X
g0mop40	X			X		x			X

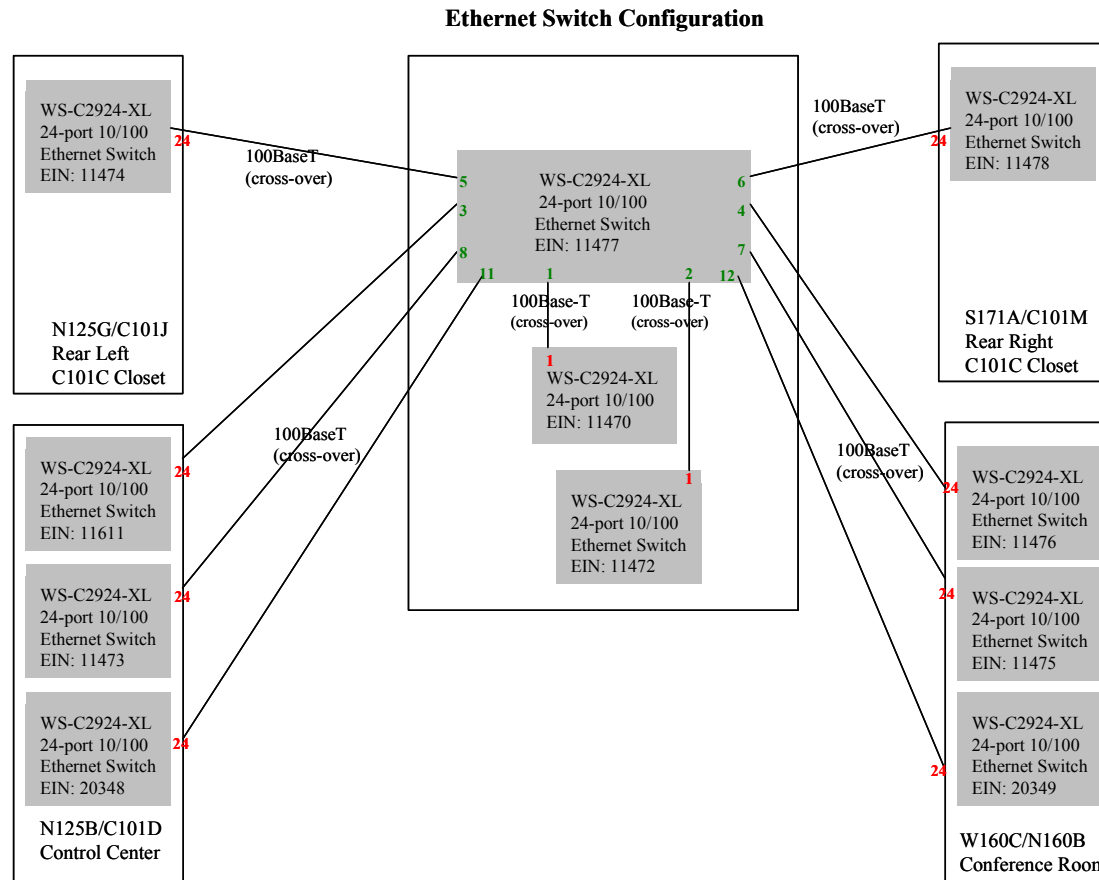
Table 4.2-1. GSFC and SMC ECS M&O HW/SW Mapping (2 of 2)

Host Name	Microsoft NT 4.0/XP Pro	Red Hat Linux 7.2	Microsoft Project 98	Xwin-32	Windows 2000	MS Office Pro 2000	Swish V2	Citrix WinFrame 1.7	Norton Antivirus 2002
g0mop41	X			X		X			X
g0mop42	X			X		X			X
g0mop43	X	X		X		X			X
g0mop44	X			X		X			X
g0mop45	X		X	X		X			X
g0mop46	X			X		X			X
g0mop49	X			X		X			X
g0mop50	X		X	X		X			X
g0mop51	X			X		X			X
g0mop52	XP Pro			X		X			X
g0mop53	X			X		X			X
g0mop54	X		X	X		x			X
g0mop55	X			X		X	X		X
g0mop58	X			X		X			X
g0mop59	X			X		X			X
g0mop60	X			X		X			X
g0mop62	X			X		X			X
g0mop64	X			X	X	X			X
g0mop65	XP Pro					X			X
g0mop66	XP Pro					X			X
g0mop67	XP Pro					X			X

Table 4.2-2. GSFC and SMC UNIX Workstations HW/SW Map

Host Name	Solaris 2.8 With 02/02 Solaris Patches	Veritas Volume Manager	Tripwire 2.0	Legato Networker 6.1.2 (Client)	Sparc C Compiler	Sparc C++ Compiler	Sparc FORTRAN Compiler
g0mos01	X			X			
g0mos02	X			X			
g0mos03	X			X			
g0mos04	X			X			
g0mos05	X			X			
g0mos06	X			X			
g0mos07	X			X			
g0mos08	X			X			
g0mos09	X	X		X	X	X	X
g0mos10	X			X			
g0mos11	X			X			
g0mos12	X			X			
g0mos13	X			X			
g0mos14	X			X			
g0mos15	X			X			
g0mos16	X	X		X (Srvr)			
g0mos17	X			X			
g0mos18	X			X			
g0mos19	X			X			
g0mos20	X			X			
g0mos21	X			X			
g0mos22	X			X			
g0mos23	X			X			
g0mos24	X			X			
g0mos25	X			X			
g0mos26	X			X			
g0mos27	X			X			
g0mos28	X			X			
g0mos29	X			X			

GSFC DAAC M&O Network Infrastructure



Port numbers in **RED** denote molb, molc, and mo2-mo8 interconnectivity with enet-mo1a.
 Port numbers in **GREEN** denote enet-mo1a port usage.

Last Updated: 01/07/2003

Figure 4.2-5. GSFC and SMC M&O LAN Topology

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Section 5. GSFC DAAC and SMC M&O Equipment Test Results

5.1 GSFC DAAC and SMC Requirements Traceability

Table 5-1 shows the mapping of Section 3 requirements to GSFC, SMC M&O hardware and software elements described in section 4.

Table 5-1. GSFC DAAC and SMC M&O Requirements Mapping (1 of 2)

Requirement	Description	SW Component(s)
GSFCMO0100	Number of staff	PCs: Windows NT 4.0 Workstations/Servers: Sun Solaris 2.8
GSFCMO0110	System administration	PCs: Norton Utilities 2000 Workstations/Servers: Sun Solaris 2.8 Legato Networker
GSFCMO0120	Management status and performance reports	PCs: Windows NT 4.0 Microsoft Office 2000
GSFCMO0130	Management and technical reports	PCs: Windows NT 4.0 Microsoft Office 2000
GSFCMO0140	DAAC internal coordination	PCs: Windows NT 4.0 Microsoft Office 2000 Workstations/Servers: Sun Solaris 2.8 z-Mail
GSFCMO0150	DAAC external coordination	PCs: Windows NT 4.0 Microsoft Office 2000 Workstations/Servers: Sun Solaris 2.8 z-Mail

Table 5-1. GSFC DAAC and SMC M&O Requirements Mapping (2 of 2)

Requirement	Description	SW Component(s)
GSFCMO0160	ECS documentation	PCs: Windows NT 4.0 Microsoft Office 2000
GSFCMO0170	System Support	Workstations/Servers: Sun Solaris 2.8
GSFCMO0200	Management planning resources	PCs: Windows NT 4.0 Microsoft Office 2000 Microsoft Project 2000
GSFCMO0210	Management policies and procedures	PCs: Windows NT 4.0 Microsoft Office 2000
GSFCMO0300	Operations data	PCs: Windows NT 4.0 Microsoft Office 2000 Xwin-32
GSFCMO0310	DAAC unique software	Workstations/Servers: Sparcworks Visual Workshop C++ Tools H++ DB Tools H++ Core Library Sybase CT Library Access SW Parts Manager
GSFCMO0400	Operations policies and procedures	PCs: Windows NT 4.0 Microsoft Office 2000

5.2 Test Results

Installation of the GSFC DAAC and SMC M&O Hardware occurred in 1997 and 1998. When the hardware and software was installed, each computer was initialized and the functionality of all HW, SW and networks verified.

Abbreviations and Acronyms

ECS	EOSDIS Core System
CCB	Configuration Control Board
CCR	Configuration Change Request
CM	Configuration management
COTS	Commercial Off the Shelf
DAAC	Distributed Active Archive Center
GSFC	Goddard Space Flight Center
HW	Hardware
ILS	Integrated Logistics Support
LRU	Line Replaceable Unit
M&O	Maintenance and Operations
QA	Quality assurance
RMA	Reliability, Maintainability, Availability
SMC	System Monitoring Center
SW	Software
TT	Trouble tickets

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